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  - Benefits & goal
  - Types

- 8 Step Problem Solving process
  - Why?
  - When?
  - How?

- Quiz Time
What do we know already?
Introduction
PROBLEM SOLVING

We can't solve problems by using the same kind of thinking we used when we created them.
Benefits of Structured Problem Solving process

• Remove time lost in debate
• Identify weak points in processes
• Discover systemic causes
• Explain with reasons why an incident occurred
• Gives a factual representation of the incident
• Compare what actually happened against what should have happened, at any point during the incident.
Standard Problem Solving to ensure...

Problems Don’t Reoccur
Types of problem solving methods

DMAIC

8 Disciplines
1. Define the problem
2. Build a team
3. Containment action
4. Determine the root cause
5. Verify the root cause
6. Corrective Action
7. Prevention
8. Congratulate the team

First 5 Steps
Solve the Actual Problem

Last 3 Steps
Deploy Solution
Share Knowledge
Create Standards

IMANCE MATTERS MOST™
8 Step Problem Solving – data driven tool

First 5 Steps
- Solve the Actual Problem

Last 3 Steps
- Deploy Solution
- Share Knowledge
- Create Standards
8 Step Problem Solving Process
Why use this process approach?

- Process has proven its usefulness in other companies
- Common methodology – everybody understands how
- Focus on Fixing it - first time right
- Define priorities
- Sharing the lessons learned with others
When do we use the 8 Step Process?

- Significant or repetitive complaints
- Repetitive human errors occurring during a specific process
- Repetitive equipment failures associated with a specific process
- Performance is generally below desired standard
- ...

Major impact or Repetitive issues
How to solve problems?

ICONS?

- The Problem Solving process is based upon

- Plan
- Do
- Check
- Act
How does the process in more detail look like?

8 Step Approach

1. ... Determine Root Cause
2. ... Develop Countermeasures
3. ... Standardize process - Sustain the gain
4. ... Clarify the Problem
5. ... Confirm Results & Process
6. ... Target Setting
7. ... See Countermeasures through
8. ... Break down the problem
Fit detail with PDCA?

1. Clarify the Problem
2. Break down the problem
3. Target Setting
4. Determine root causes
5. Develop countermeasures
6. See countermeasures through
7. Confirm results & process
8. Standardize process – Sustain the gain
Step 1: Clarify the Problem
Step 1: Clarify the Problem

**Desired / Ideal Situation**

**Current Situation**

**Gap = Problem**

- We need to understand the Current Situation (Measured), Ideal Situation (Standard)
- Why is it a problem? What is the KPI affected? What is the cost? Relation to Objective? Why is it a priority?
Step 1: Clarify the Problem

What is a problem?

- Anything that deviates from the standard or target
Step 1: Clarify the Problem

What is a problem?.....cont

A gap between actual and desired conditions
Step 1: Clarify the Problem

What is a problem?.....cont

- An unfulfilled customer’s need
Step 1: Clarify the Problem

Problem type - I

1. Standard not achieved

The standard = 100% on time delivery

Actual = 82% on time delivery
Step 1: Clarify the Problem

Problem type II

2. Standard achieved, but a higher standard is now required

The new higher standard is target
Step 1: Clarify the Problem

Problem type III

3. Performance to standard varies (not consistently achieved)
Problem Solving Guide

Step 2: Break Down the Problem
Step 2: Break Down the Problem

Problem (complex – vague)

- Problem
- Problem
- Problem
- Prioritized Problem
- Problem
- Problem
- Problem

Break down

- Break down
- Break down

Prioritize the problem

- What, Where, When, Who
  - Why

See the Process

Problem to tackle
Step 2: Break Down the Problem

- Requires to study the process to detail
- Dedicate sufficient time for the breakdown
- Study the steps of the process, interact with people, get data, documents, understand tools: Learn
- All problems can be divided into smaller defined problems: by region, location, department, product, channel, customers, etc.
- Specify the point of cause: the problem is present in a specific part of the process
Step 2: Break Down the Problem

Restaurant Revenue Declining

- Food
  - Is everything fresh?
  - Is it consistently tasty?
- Delivery
  - Is everything served hot?
  - Served at the same time?
  - Are the plates clean?
- Atmosphere
  - Is the restaurant too noisy?
  - Is there enough room between tables?
- Advertising
  - Did our advertising change?
  - Is it ineffective?

Customer Service
- Is the staff responsive?
  - Are mistakes made?
  - Taking orders
  - On the bill
- Are repeat customers recognized?
  - To get a table
  - To get your food
  - To get your bill

Waiting time
Step 2: Break Down the Problem

- Specify the Point of Cause by Studying the Process
- Specify the Point of Cause is necessary for Effective Root Cause Analysis
Step 3: Target Setting
Step 3: Target Setting

SMART

What? How much? By when?

Output / Deliverable To Be Achieved

NOT things to DO

Targets are a tool to stimulate improvement
Step 3: Target Setting

**GOOD** or **BAD**

**B** ▪ We will improve the way we handle complaints

**B** ▪ We will reduce the number of complaints by 10% by next FY

**G** ▪ We will increase our CPE score from 75% to 85% in next FY by end of Q3

**B** ▪ We will increase our sales next FY
Problem Solving Guide

Step 4: Determine the Root Cause
Why Root Cause Analysis?

- To solve problems on structural basis
- To ensure problems do not return
- To ensure sustainable improvements are made
Step 4: Determine Root Cause

- Observed Symptoms
  - Containment action
- Fact Gathering & Analysis
- DIRECT Causes
  - Corrective action
- More Detailed Analysis
  - Preventive action
- ROOT Causes
Tools used in Problem Solving

- Multi-disciplinary Teamwork
- Brainstorming
- Pareto analysis (80/20)
- Fishbone Diagram
- 5W Diagram
- Checksheet
- Control Chart
Tools used in Problem Solving

- No judgment or criticism
- Quantity over quality → Quality implies judgment
- Freewheel → Do not get trapped by your own train of thinking
- Mutate and combine → Keep using previous ideas as stimuli for new ideas

- Visualization of measurements
- Upper & lower specification limits + mean
- Location of measurements helps analysis
Tools used in Problem Solving

- Recording manually
- Mark per topic, number of occurrence
- Visualization can be done via Histogram (distribution), Pareto (counts), location
Universal principle, called the "vital few and trivial many"

- Pareto's Principle or the 80/20 Rule - 20 percent of something always are responsible for 80 percent of the results

20% of the input creates 80% of the result
20% of the workers produce 80% of the result
20% of the customers create 80% of the revenue
20% of the bugs cause 80% of the crashes
20% of the features provide 80% of the usage
Cause & Effect diagram

Fishbone Diagram
Cause-&-Effect (Fishbone) Diagrams

Problem:

We start a Fishbone Diagram with problem in right-hand box …
Potential causes to the Problem are added as more detailed, smaller branches …
Tools used in Problem Solving

As we PROVE, or DISPROVE Causes with data (if possible) or via voting, we mark the C-E (Fishbone) Diagram accordingly …
Try to make your “Effect” measurable – can you graph it?

Sometimes, the ‘6M’s’ are replaced with ‘P’s’ for Office processes:
- Policies
- People
- Procedures
- Plant (Facility)
- Programs (Software)
- Planet
- Price
- Promotion
- People
- Processes
- Place
- Policies
- Procedures
- Product

Do not waste time discussing the branches

Just Do it !!!!

You can use what fits your needs
Example: C&E diagram

Mother Nature

- Too expensive
- No airco
  - Too warm in production

Method

- No standard work
- Perception no need
- WI not structural used
  - Not available
  - Not up to date
  - Training
  - Not enough resources
  - Not enough responsibility
  - Not enough communication
  - Not enough capacity
  - No time to execute checks

Man

- Not available

Machine

- Not calibrated

Material

- Not calibrated
- Not approved vendor
  - No agreement with supplier
- Material defective

Measurement

- No defined tolerances
- No correct use of measurement tool
- Not correct measurement tool

Quality Problem

- To heavy
- Not maintained
- Not capable
  - Wearing of machine

CAPTIONS

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5 Why’s
Example – 5 Why

Problem: My car will not start.

1. Why? - The battery is dead.
2. Why? - The alternator is not functioning.
3. Why? - The alternator belt has broken.
4. Why? - The alternator belt was well beyond its useful service life and has never been replaced.
5. Why? - I have not been maintaining my car according to the recommended service schedule.

(The last “why” should be root cause)
Example – 5 Why

Customers wait too long on the phone at the end of the month.

The last week of the month is the busiest for sales.

The company offers more incentives to customers late in the month.

Sales are usually behind the goal late in the month.

Customers have learned that if they wait, they will get incentives.

Root Cause

Sales targets are done on a monthly basis, letting a big deficit form.

Action: Make weekly sales goals instead of monthly targets to prevent getting so far behind.
Don’t need to do exactly 5 Why’s?
- You may find yourself using 3 to 7 “Why’s” or more on a problem
- “Strive for 5” Why’s (don’t quit too early!)
- Use as many as you NEED to get to ACTIONABLE Root Cause
- Base “Why’s” on Facts and Observations, not Opinions

Test your “Why” logic by using “Therefore” in reverse

Make the tools work for you, don’t be a slave to the tools
## 5 Why – Tree

**Legend:***
- **Cause** - cause with low impact
- **Cause** - cause with medium impact
- **Cause** - cause with high impact

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BRADY® WHEN PERFORMANCE MATTERS MOST™
Step 5: Develop Countermeasures
Step 5: Develop Countermeasures

- Consider: How to eliminate the root causes
- Use creativity techniques to generate large number of ideas:

**Brainstorming**
- All participants present their ideas, and the idea collector records them
- Focus on quantity
- Unusual ideas are welcome

**Brainwriting**
- All participants collect ideas and write their ideas on a note (approx. 3 ideas, duration 5 minutes)
- Repeat this process 5 times

Start without any evaluation of the ideas!
Step 5: Develop Countermeasures

Evaluation of ideas

1. Cost-benefit Analysis
   The method is usually run in three steps:
   1.) Definition of all elements causing costs of idea implementation
   2.) Definition of all elements causing benefits of idea implementation
   3.) Comparision sum of all costs with the sum of all benefits

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Step 5 : Develop Countermeasures

2. Evaluation matrix
The main goal of evaluation matrix is to evaluate an idea in accordance to several factors or criteria.

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Score = Rating x Weight
Psychology of Countermeasures

- Good problem solving and countermeasure preparation will drive an organization to:
  - Productive self-criticism
  - More robust systems and processes
  - A higher-level understanding

The countermeasure cycle is a team effort!

Effective Problem Solving with robust countermeasures lead to better processes!
Step 6: See Countermeasures through
Step 6: See Countermeasures through

- Share information with others by informing, reporting and consulting
- Review the progress of the action plan and the results in regular review meeting
- Ensure that your countermeasures do not create adverse effect to other upstream or downstream processes
Step 7: Confirm Results and Processes
Step 7: Confirm Results & Processes

- Evaluate if target was achieved or not
- Evaluate the process and ensure that it is sustainable
- Confirm negative and positive effects
- Share evaluation with people involved
Step 8: Standardize Process
Step 8: Standardize process

- Set successful processes as new standard
- Share the new standard (Yotoken)
Step 8: Standardize process

- Start the next round of improvements
- PDCA → SDCA
Quiz Time
Quiz time

Which is the correct combination of Cause-&-Effect (Fishbone) category headings?

- Procedure, Policy, Plant, Person, Planet, Programs
- Suppliers, Procedures, Customers, Management, Policies
- Movement, Materials, Machine, Measurement, Mother Nature
- None of the above, all are valid
Quiz time

When do we need to stop asking Why?

- After identification of direct cause
- After 5 times asking Why
- After identification of 5th symptom
- After identification of actionable root cause
Quiz time

Which of the following is not part of the 8 steps in the Problem-solving process?

- Define the Problem
- Verify the Effectiveness of the implemented Solution(s)
- Analyze the Problem to its Root Cause
- Target setting
- All of the above are steps in the Problem-Solving process
Quiz time

**TRUE** or **FALSE**

- **T** The major fault of problem solving is jumping to conclusions
- **F** We need to follow the 8 step method for all problems
- **T** "Object" problems are easier to solve than "people" problems
- **T** People who anticipate potential problems are generally thought to be negative
Thank you!
Example of synergies between tools

Team Work
- Ensure that a team is gathered to discuss the problem
- Multi disciplinary team sparks creativity & “out-of-the-box” thinking

Brainstorm
- Brainstorming can be used for 5Whys as well as for C&E diagram as method for obtaining ideas on causes

Fishbone Diagram (also known as the cause and effect or Ishikawa)
- The fishbone diagram helps you explore all potential and/or real causes that result in a single defect or failure.
- Once inputs are established on the fishbone, you can use the 5 Whys technique to further drill down to the root causes

5 Why’s
- The 5 Whys can be used individually or as a part of the fishbone diagram.
Comparison Problem Solving Processes

Deming’s PDCA

Plan → Do → Check → Act

Define the problem → Statistically find Root Causes → Improve → Sustain improvements

Define - Measure - Analyze - Improve - Control

Problem Definition → Measure what is important → Analyze potential solutions → Select & implement → Verify effects

MBF

8D

Should We Do This? → Establish the Team → Problem Statement Description → Define & Verify Root Cause and Stop Fact → Develop & Implement Corrective Action → Complete Action & Verify Effect → Implement and validate Permanent Corrective Actions (PCA) → Recognize Team and Individual Contributions
Step 1: Clarify the Problem

Step 2: Break Down the Problem

Step 3: Target Setting

Step 4: Determine the Root Cause

Step 5: Develop Countermeasures

Step 6: See Countermeasures through

Step 7: Confirm Results and Processes

Step 8: Standardize Process